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(54) MINERAL MINING EQUIPMENT

(71) We, MINING SUPPLIES LIMITED, a British Company of Hillcrest Works, Carr Hill, Balby, Doncaster, do hereby declare the invention for which we pray that a Patent may be granted to us and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to mineral mining equipment and in particular to spiral vane discs (also known as spiral vane drums), which in use are mounted on and rotatably drive by shearer type mining machines. Such discs are in extensive use in the coal mining industry and consist essentially of a central tubular body around the outer periphery of which is welded at least one van extending from an end plate located at one end of the drum, the vane and end plate each having pick boxes welded thereto to house the shanks of mineral cutting picks. In practice the drum may carry one, two, three or four vanes, the last three arrangements starting respectively at 180°, 120° and 90° apart at the end plate and finishing in similar disposition.

While such discs have enjoyed large commercial success there is always with coal mining the problem of dust and various attempts have been made in the past to combat this problem by the use of water sprays directed at or towards the mineral cutting zone.

According to the present invention, a spiral vane disc or drum comprises at least one vane fabricated from a main plate and a closure plate, the main plate comprising an inner portion, located adjacent the outer periphery of a tubular body, and having a bottom face and foot portion, the latter being seated on, and welded to, the outer periphery of the tubular body and the bottom face being spaced outwardly therefrom, and the closure plate being welded to both the outer periphery of the tubular body and to the main plate, so as to define, with an enclosed portion of the outer periphery of the tubular body, a water channel, with at least one water conveying port provided in the main plate and extending at least partially in a radial direction, the or each port intersecting the bottom face and connecting the water channel to the outside of the vane.

Thus, the or each vane is of two plate construction that provides a continuous unobstructed, peripheral water channel which can be flushed through on completion of fabrication to ensure removal of the inevitable debris accumulated during fabrication, but furthermore, the closure plate need not be welded in position until after the water ports have been machined. Thus, the machining can be inspected and inevitable swarf removed before the water channel is completed by welding of the closure plate. The total volume of water contained in the channel, is of course dictated by the cross-sectional area, which area can be varied to provide the required water volume e.g. 2 gallons per vane.

The bottom face may be a shoulder e.g. by making the main plate generally of inverted "L" shape. Alternatively, the bottom face may be angled and formed as a chamfer.

Preferably, the main plate is one piece and produced as a pressing to a scroll form to wrap around the periphery of the tubular body. The closure plate may be similarly one piece. It is however possible to build up a vane from a plurality of main plates welded one to the other, similarly with whatever construction of main plate, the closure plate may be constructed from a plurality of individual closure plate members.

The ports may take the form of radial and/or axial and/or intermediate holes drilled into the main plate and extending from the water channel to the outside of the vane, at any of the required positions around the vane(s) where water spray is required e.g. adjacent a pick box. Preferably each port terminates in a spray nozzle, which may be screwed into suitably tapped end of the port, with this machining again effected before welding of the closure plate.

Supply of water to the water channel can readily be provided through a hole drilled radially in a portion of the tubular body adjacent a portion of the water channel, so that the latter may communicate with the inside of the tubular body, water being supplied to the inside thereof via suitable conduit etc.

It is of course possible to mount any required pick-box/pick-combination on the vane as well as on the usual end plate.

The invention will now be described in greater detail by way of examples with reference to the accompanying drawings in which:—

Figure 1 is a sectional view through a first

embodiment of spiral vane disc in accordance with the invention;

Figure 2 is a sectional view through a second embodiment of spiral vane disc in accordance with the invention; and

Figure 3 is a sectional view through a third embodiment of spiral vane disc in accordance with the invention.

In all embodiments, like parts have been accorded like reference numerals.

In the embodiment of Figure 1, a spiral vane disc, indicated generally at 1 comprises at least one vane 2 welded to outer periphery 3 of wall 4 of a tubular body 5 having an interior 6. The body 5 is adapted to be mounted on, and driven by, the arbour of a mining machine e.g. a coal face shearer, in the well known manner.

The vane 2 is fabricated from a main plate 7 and a radially extending closure plate 8. The main plate 7 comprises an inner portion 9 adjacent the tubular body 5 and having a chamfered bottom face 10 which together with the closure plate 8 and an enclosed portion 11 of the outer periphery 3, defines a water channel 12. The main plate 7 also has a foot portion 13 which seats on the outer periphery 3 and is secured there by welds 14 and 15, while the closure plate 8 is welded at 16 to the outer periphery 3 and at 17 to the main plate 7. The latter is also provided with a plurality of radially extending water conveying ports 18 terminating at the end of the main plate 7 remote from the body 5, in a tapped end 19 to receive a correspondingly threaded spray nozzle (not shown) at a location where spraying is required e.g. at a pick-box (not shown). Each port 19 at its other end intersects the bottom face 10 and communicates with the water channel 12. The latter is also intersected by a radial hole 20 drilled through the wall 4 to put the water channel 12 in communication with the interior 6 of the body 5. The interior 6 is provided with water hoses and/or conduits (not shown) by which water is conveyed from an area of the mining machine e.g. after cooling one or more motors of the mining machine, to the water channel 12 and hence the ports 18 and their spray nozzles, the direction of water flow being indicated by the arrows 21.

It will be appreciated that the closure plate 8 need not be applied until the ports 18 have been drilled, inspected and flushed out. Furthermore, even after application of the closure plate 8, the water channel 12 and ports 18 may be flushed out before the spray nozzles are screwed in.

The main plate 7 of the or each vane 2 may be a one piece member pressed to a helical shape or the main plate 7 may be fabricated from a plurality of main plate members. Similarly, the closure plate 8 may be of single or mulit-member construction.

In the embodiment of Figure 2, the closure plate 8 is not radial as with the previous embodiment, but is located at an angle, which has the effect of increasing the volume of the water channel 12. Also indicated in this embodiment is an exial conveying port 18A which again may be tapped to receive a spray nozzle.

In the embodiment of Figure 3, the closure plate 8 is again radially located, but in contrast to Figure 1, is welded at 17 to a flank of the main plate 2.

WHAT WE CLAIM IS:—

1. A spiral vane disc or drum comprising at least one vane fabricated from a main plate and a closure plate, the main plate comprising an inner portion, located adjacent the outer periphery of a tubular body, and having a bottom face and foot portion, the latter being seated on, and welded to, the outer periphery of the tubular body and the bottom face being spaced outwardly therefrom, and the closure plate being welded to both the outer periphery of the tubular body and to the main plate, so as to define, with an enclosed portion of the outer periphery of the tubular body, a water channel, with at least one water conveying port provided in the main plate and extending at least partially in a radial direction, the or each pot intersecting the bottom face and connecting the water channel to the outside of the vane.

2. A spiral vane disc or drum as claimed in Claim 1, wherein the bottom face is a shoulder with the main plate generally of inverted "L"-shape.

3. A spiral vane disc or drum as claimed in Claim 1 wherein, the bottom face is angled and formed as a chamfer.

4. A spiral vane disc or drum as claimed in any preceding Claim, wherein the main plate is one piece and produced as a pressing to a scroll form to wrap around the periphery of the tubular body.

5. A spiral vane disc or drum as claimed in any preceding Claim, wherein the closure plate is of one piece construction.

6. A spiral vane disc or drum as claimed in any one of Claims 1 to 3, wherein the or each vane is built up from a plurality of main plates welded one to the other.

7. A spiral vane disc or drum as claimed in any one of Claims 1 to 4, wherein the closure plate is built up from a plurality of individual closure plate members.

8. A spiral vane disc or drum as claimed in any preceding Claim, wherein the ports take the form of radial and/or axial and/or intermediate holes drilled into the main plate and extending from the water channel to the outside of the vane, at any of the required positions around the vane(s) where water spray is required.

9. A spiral vane disc or drum as claimed in any preceding Claim, wherein each port terminates in a spray nozzle.

10. A spiral vane disc or drum as claimed in Claim 9, wherein each spray nozzle is screwed into a tapped end of its port.

11. A spiral vane disc or drum as claimed in

any preceding Claim, wherein supply of water to the water channel is provided through a hole drilled radially in a portion of the tubular body adjacent a portion of the water channel, so that the latter may communicate with the inside of the tubular body, water being supplied to the inside thereof via suitable conduit.

12. A spiral vane disc or drum as claimed in any preceding Claim, wherein the or each vane carries pick-boxes.

13. A spiral vane disc or drum as claimed in any preceding Claim, having at one end of the tubular body an end plate provided with pick-boxes.

14. A spiral vane disc or drum substantially as hereinbefore described with reference to Figure 1 of the accompanying drawings.

15. A spiral vane disc or drum substantially as hereinbefore described with reference to Figure 2 of the accompanying drawings.

16. A spiral vane disc or drum substantially as hereinbefore described with reference to Figure 3 of the accompanying drawings.

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1584635 COMPLETE SPECIFICATION

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Sheet 1

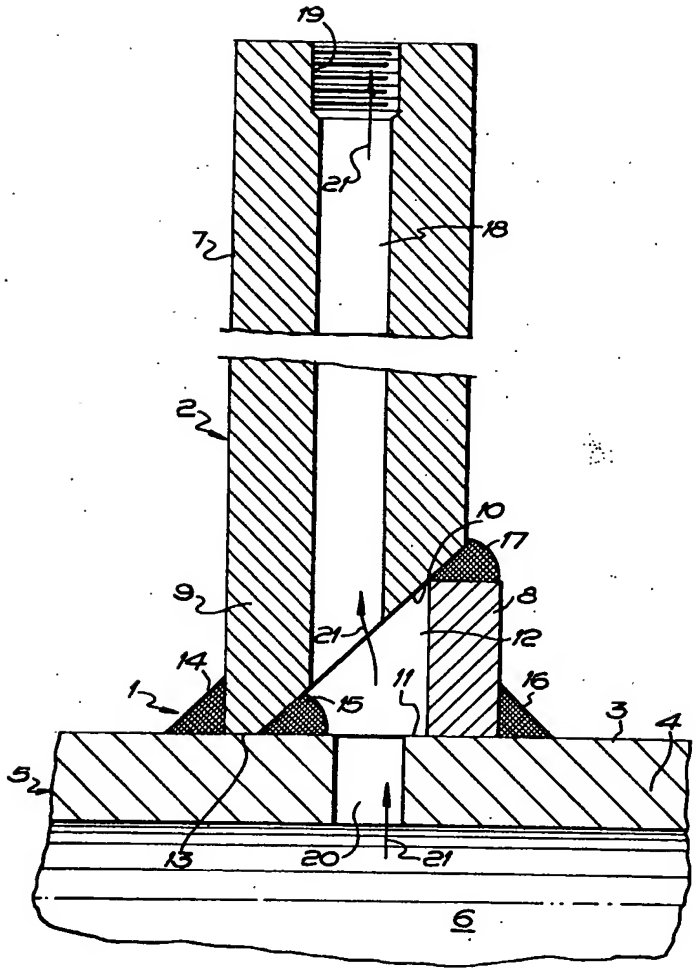

FIG. 1

1584635 COMPLETE SPECIFICATION

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Sheet 2

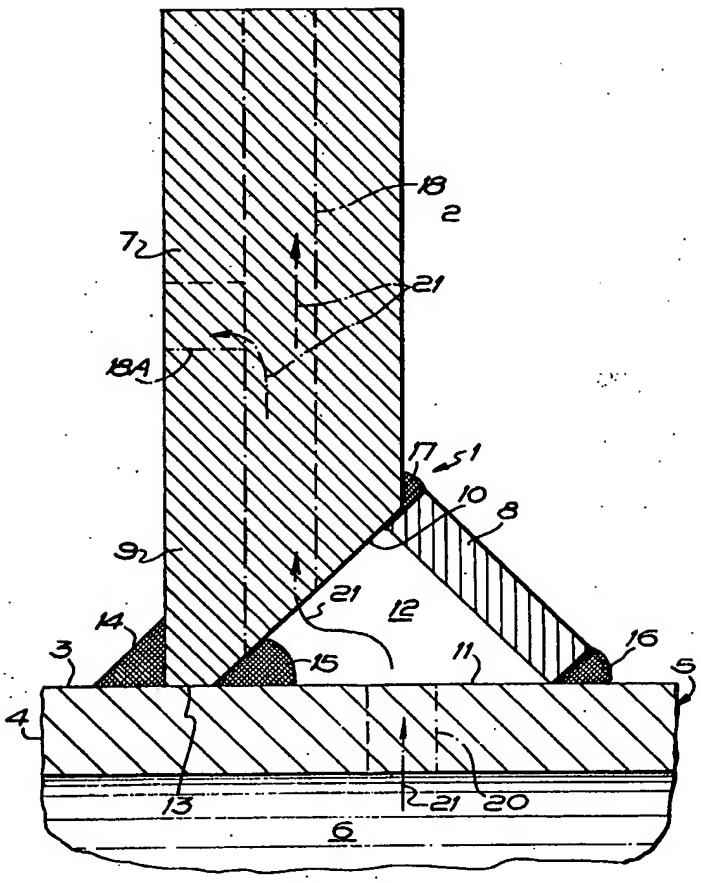

FIG. 2

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Sheet 3

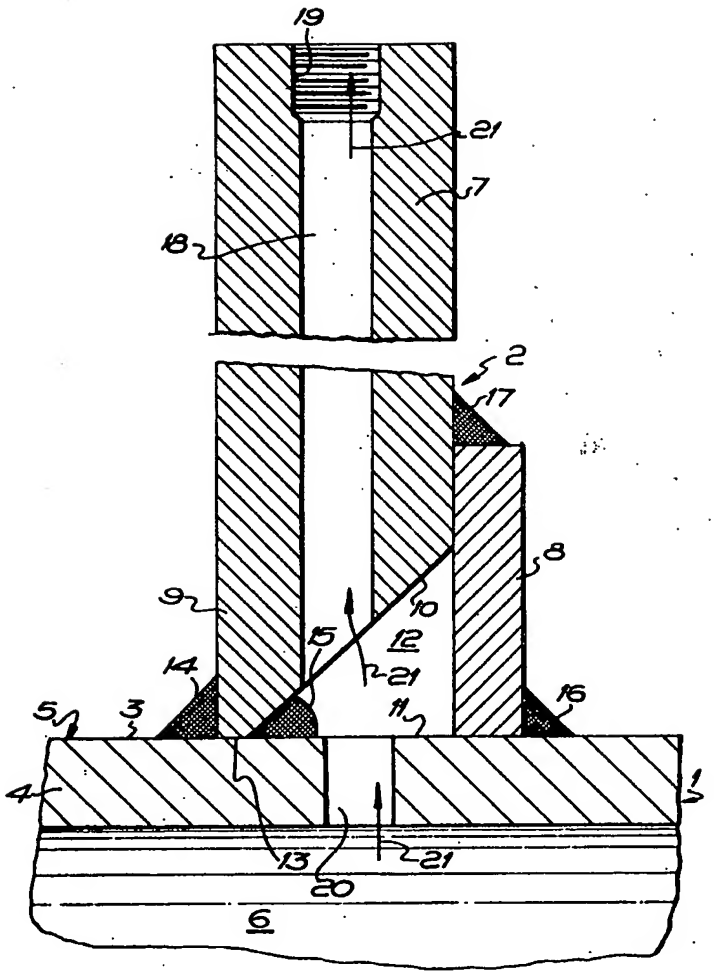

FIG. 3